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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, SANG H

ART UNIT PAPER NUMBER

2877

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/973,000

Applicant(s)

OHSHIMA ET AL.

Examiner

Sang H Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “**a first reflection optical system**” and the “**a second reflection optical system**” in claim 10-13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

3. The information disclosure statement filed 12/28/01 fails to comply with 37 CFR 1.97© because it lacks a statement as specified in 37 CFR 1.97(e), for example, Form PTO-1449, Applicant's name, Examiner Initial, Examiner Signature and Date Considered, It has been placed in the application file, but the information referred to therein has not been considered.

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Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 2, and 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said object" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claims recite the limitation "the scattered light" in claim 1 line 6, claim 2 line 8 and claim 6 line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 line 18, claim 2 line 21, claim 6 lines 12-13, and claim 7 lines 16-17; the term "that of said defects" is vague and unclear. What does applicant mean "that of said defects".

Claim 8 line 10, claim 9 line 11, and claim 10 line 17; the term "it is arranged such that" is vague and unclear. What does applicant mean "it is arranged such that". However, the

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limitation "it is arranged such that" in claim 8 line 10 and claim 9 line 11. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-9 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Sekine et al (U.S. Patent No. 6,104,481).

Regarding claims 1-9 and 19; Sekine et al discloses a method and an apparatus for detecting foreign particle and defect, comprising:

* an illumination optical system (10 of figure 1) for irradiating a plurality of laser beams (11,12 of figure 1 and col.6 lines 27-29) having different wavelengths (col.6 line 30) from different angles onto a substantially same location of an object (2 of figure 1 and col.2 lines 32-38);

* a detection section (30,50 of figure 1 or 41,42 of figure 3) for dividing and detecting a scattered light reflected from the location of the object (2 of figure 1) by each of the wavelengths (11,12 of figure 1);

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* a conversion section (111,112 of figure 3) for converting the scattered light of the respective detected wavelengths (11,12 of figure 1) into an electrical signal; and

* a discernment section (120 of figure 3 or 230 of figure 12) for discerning a state of the foreign particle and defect to the electrical signal of the respective wavelengths (figures 8a-8c and 9a-9c), wherein an irradiation location (figure 1) of the laser beam moves with regard to a surface of the object (2 of figure 1) in detection for moving points by a displacement portion (60 of figure 1). See figures 1-13.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 10 and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by Marxer et al (U.S. Patent No. 6,271,916).

Regarding claims 10 and 17; Marxer et al discloses a method and an apparatus for detecting foreign particles and defect; comprising:

* an irradiation means (1 of figure 1) for irradiating a laser beam (1014 of figure 7) onto an object (1012) in detection;

* a first reflection optical system (1042 of figure 7) for introducing a scattered light (figure 7 from the surface of the object [1012 of figure 7] through lenses [1032 of figure 7] to mirror [1034 of figure 7]) of the laser beam in reflection from a surface of the object (1012 of figure 7) into a first direction that is substantially vertical with regard to the surface of the object (figures 7 and 9);

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* a second reflection optical system (1044 of figure 7) for introducing the scattered light through a curved mirror (1038 of figure 7) and dividing the scattered light into a plurality of second directions (figure 7) from the first direction of the first reflection optical system (1042 of figure 7);

* a device portion of system (1010 of figure 7) having a comparison means (col.1 line 60, col.4 lines 38-54) for comparing a first signal output of the first reflection optical system (1042 of figure 7) with a second signal output of the second reflection optical system (1044 of figure 7); and

*a displaying means (figure 8) for displaying a result obtained so as to indicate Si surface, large PSL sphere, and small PSL sphere by the comparison means (col.1 line 60 and col. 4 lines 38-54), wherein the foreign particle and defect are separately detected to a directivity of the scattered light in reflection (col.13 lines 23-67). See figures 1-9.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

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ii. Claims 11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxer et al (U.S. Patent No. 6,271,961) in view of Vaez-Iravani et al (U.S. Patent No. 6,201,601).

Regarding claim 11 and 14-16; Marxer et al discloses a method and an apparatus for detecting foreign particles and defect; comprising:

- * an irradiation means (1 of figure 1) for irradiating a laser beam (1014 of figure 7) onto an object (1012) in detection;

- * a first reflection optical system (1042 of figure 7) for introducing a scattered light (figure 7 from the surface of the object [1012 of figure 7] through lenses [1032 of figure 7] to mirror [1034 of figure 7]) of the laser beam in reflection from a surface of the object (1012 of figure 7) into a first direction that is substantially vertical with regard to the surface of the object (figures 7 and 9);

- * a second reflection optical system (1044 of figure 7) for introducing the scattered light through a curved mirror (1038 of figure 7) and dividing the scattered light into a plurality of second directions (figure 7) from the first direction of the first reflection optical system (1042 of figure 7);

- * a device portion of system (1010 of figure 7) having a comparison means (col.1 line 60, col.4 lines 38-54) for comparing a first signal output of the first reflection optical system (1042 of figure 7) with a second signal output of the second reflection optical system (1044 of figure 7); and

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*a displaying means (figure 8) for displaying a result obtained so as to indicate Si surface, large PSL sphere, and small PSL sphere by the comparison means (col.1 line 60 and col.4 lines 38-54), wherein the foreign particle and defect are separately detected to a directivity of the scattered light in reflection (col.13 lines 23-67). See figures 1-9.

Marxer et al teaches all of features in claimed invention except for an irradiation means for dividing an incident path of a laser beam with regard to an object in detection into a first incident path and a second incident path. However, Vaez-Iravani et al teaches that it is known in the art to provide an irradiation means (52 of figure 2) for dividing an incident path of a laser beam (54 of figure 2) by a polarizing beamsplitter (62 of figure 2) to an object (76 of figure 2) in detection into a first incident path (70 of figure 2) and a second incident path (90 of figure 2). See figures 3-5.

Therefore, it would have been obvious to having ordinary skill in the art at the time the invention was made to modify a method and an apparatus for detecting foreign particles and defect of Marxer et al with an irradiation means for dividing an incident path of a laser beam with regard to an object in detection into a first incident path and a second incident path as shown in the method and device of Vaez-Iravani et al for the purpose of improving inspection system with good sensitivity for particles and defects on the wafer.

12. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marxer et al (U.S. Patent No. 6,271,961) in view of Vaez-Iravani et al (U.S. Patent No. 6,201,601) and Quackenbos et al (U.S. Patent No. 4,794,264).

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Regarding claims 12-13; Marxer et al and Vaez-Iravani et al discloses all of features in claimed invention as indicated above claim 11, except for means for summing up a first signal by converting the scattered light of the first optical system and a second signal by converting the scattered light of the second optical system, and comparing a result as summed up in each of the first and second incident paths. However, Quackenbos et al teaches that it is known in the art to provide means (42a,92,50 of figure 4) for summing up a first signal (46a of figure 4) by converting the scattered light of the first optical system (48a of figure 4) and a second signal (44a of figure 4) by converting the scattered light of the second optical system (28a of figure 4), and comparison and displaying means (50,114,112,118 of figure 4) for comparing a result as summed up in each of the first and second incident paths (26,30 of figure 4). See figures 1-9.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a method and an apparatus for detecting foreign particles and defect of Marxer et al with means for summing up a first signal by converting the scattered light of the first optical system and a second signal by converting the scattered light of the second optical system, and comparing a result as summed up in each of the first and second incident paths as shown in the method and device of Quackenbos et al for the purpose of detecting and distinguishing large and small defects or particles.

Conclusion

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13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vaez-Iravani et al (6,384,910) discloses sample inspection system; Noguchi et al (6,411,377) discloses optical apparatus for defect and particle size inspection; Ravid et al (6,256,093) discloses on the fly automatic defect clarification for substrates using signal attributes; Vaez-Iravani et al (6,538,730) discloses defect detection system; or Shishido et al (5,410,400) discloses foreign particle inspection apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Sang Nguyen whose telephone number (703)308-6426. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Frank Font, can be reached on (703)308-4881. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SN

Nguyen/ sn

May 27, 2003


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